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## COMPUTER NETWORKS (GATE 2023) - REPORTS

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ALL(33) CORRECT(23) INCORRECT(10) SKIPPED(0)

**Q. 1**
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Consider a IPv4 datagram in which size of option field is 24 bytes. The value of HLEN field in this datagram in binary format is \_\_\_\_\_.

 1011

 Your answer is **Correct**1011

**Solution :**

1011

Total length of IPv4 header

$$= 20 + \text{Size of option}$$

$$= 20 + 24 = 44 \text{ bytes}$$

$$\text{HLEN} = \frac{\text{Total length}}{4} = \frac{44}{4} = 11 = (1011)_2$$

 QUESTION ANALYTICS

**Q. 2**
[Solution Video](#)
[Have any Doubt?](#)

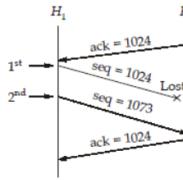
 Let two hosts  $H_1$  and  $H_2$  connected over TCP.  $H_1$  sends two TCP segments back to back to  $H_2$ . First segment has sequence number 1024 and second segment has sequence number 1073. Assume, first segment is lost but the second segment arrives at  $H_2$ . Now, in the acknowledgement that  $H_2$  sends to  $H_1$  in response of second segment, the acknowledgement number is \_\_\_\_\_. (Assume  $H_1$  got ack = 1024, before sending 1<sup>st</sup> segment)

 1024

 Your answer is **Correct**1024

**Solution :**

1024


 TCP connection is already established, so  $H_2$  and  $H_1$  know the next ack for each other.

 Now  $H_2$  expecting seq = 1024, but it get seq = 1073, so  $H_2$  know segment with seq = 1024 has lost, so, it send ack = 1024.

 QUESTION ANALYTICS

**Q. 3**
[Solution Video](#)
[Have any Doubt?](#)


Consider the following statements:

 S<sub>1</sub>: Let a host H get a ICMP segment encapsulated in IP datagram. Network layer of H uses port number to know that it is ICMP segment.

 S<sub>2</sub>: Option field of IP header ensures that a packet is forwarded through no more than N routers.

 S<sub>3</sub>: Receive window field in IP header used to indicate the number of bytes that a receiver is willing to accept.

Which of following is correct?

**A** S<sub>3</sub> is only true

**B** S<sub>1</sub> and S<sub>2</sub> are only true

 Your answer is **IN-CORRECT**
**C** S<sub>1</sub>, S<sub>2</sub>, S<sub>3</sub> are all true

**D** S<sub>1</sub>, S<sub>2</sub>, S<sub>3</sub> are all false

Correct Option

**Solution :**

(d)

 S<sub>1</sub>: Network layer uses protocol field of IP header to know ICMP.

 S<sub>2</sub>: TTL field of IP used for this purpose.

Q. 4

Solution Video

Have any Doubt?



Consider the following forwarding table at an IPv4 router R.

| Network id    | Net mask      | Net hop     |
|---------------|---------------|-------------|
| 132.100.212.0 | 255.255.252.0 | Interface 0 |
| 132.100.208.0 | 255.255.252.0 | Interface 1 |
| 132.100.196.0 | 255.255.252.0 | Interface 2 |
| 132.100.192.0 | 255.255.248.0 | Interface 3 |
| 0.0.0.0       | Default       | Interface 4 |

Let R received two packets  $P_1$  and  $P_2$  with destination IP 132.100.210.56 and 132.100.194.62 respectively. The packets  $P_1$  and  $P_2$  forwarded to next hop interfaces respectively are

 A Interface 1 and interface 0 B Interface 0 and interface 2 C Interface 1 and interface 3

Your answer is Correct

Solution :

(c)

IPv4 uses longest prefix matching rule.

$$\begin{aligned}132.100.212.0 &= \underline{132.100.1101} \underline{01}000.0 \\132.100.208.0 &= \underline{132.100.1101} \underline{00}000.0 \\132.100.196.0 &= \underline{132.100.1100} \underline{01}000.0 \\132.100.192.0 &= \underline{132.100.1100} \underline{00}000.0\end{aligned}$$

 $P_1: 132.100.210.56$  $\downarrow$   
 $\underline{\underline{11010010}}$ 

Longest match with interface 1

 $P_2: 132.100.194.62$  $\downarrow$   
 $\underline{\underline{11000010}}$ 

Longest match with interface 3

 D Interface 0 and interface 3

Q. 5

Solution Video

Have any Doubt?



Consider a network uses the slotted ALOHA medium access control protocol and network have 5 active nodes. Assume, each node attempts to transmit a frame in each slot with probability 0.2 and this frame can be new or old collided frame. The probability of successful transmission of a frame from any node in a given slot is \_\_\_\_\_. (Rounded off upto two decimal places)

 0.4096 [0.40 - 0.41]

Your answer is Correct 0.41

Solution :

0.4096 [0.40 - 0.41]

A given slot is successful if any one node transmit a frame and other do not.

- (i) a node transmit frame ( $P$ ) = 0.2
- (ii) 4 other frame do not transmit frame =  $(1 - P)^4 = (0.8)^4$

Probability of any one node successful transmit a frame in a slot

$$\begin{aligned}&= N \cdot P \cdot (1 - P)^{N-1} \\&= 5 \times (0.2) \cdot (0.8)^{5-1} = 0.4096\end{aligned}$$

Q. 6

Solution Video

Have any Doubt?



A system uses cycle redundancy check (CRC) error detection method with generating polynomial  $x^3 + x^2 + 1$ . The message bit string 10011011101 is passed to CRC and

it append the check bits  $C_2 C_1 C_0$  to this message, where  $C_0$  is least significant digit. The check bit sequence  $C_2 C_1 C_0$  is

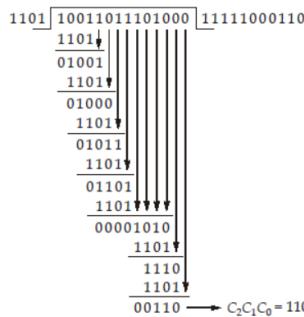
**A** 110

Your answer is Correct

**Solution :**

(a)

$$X^3 + X^2 + 1 = 1101$$



Transmitted message: 10011011101110

**B** 101

**C** 001

**D** 011

QUESTION ANALYTICS

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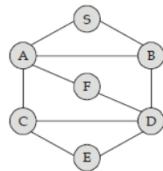
**Q. 7**

Solution Video

Have any Doubt ?

Bookmark

Consider following network of 7 routers and assume each link has same cost. This network uses reverse path forwarding, a method of controlled flooding. Let node S flood a packet in network. Node D get this flood packet from nodes C, F, B and E in this order. Node D select flood packet from only one node and transmit to other outgoing links and discard other flood packets. Flood packet of which node selected by node D?



**A** Node C

**B** Node F

**C** Node B

Your answer is Correct

**Solution :**

(c)

Method: reverse path forwarding

Shortest distance from D to S is via B. D select flood packet of S only from node B, because B is next node to shortest path to source S.

**D** Node E

QUESTION ANALYTICS

+

**Q. 8**

Solution Video

Have any Doubt ?

Bookmark

Consider a subnet of class B network which has 160.24.223.255 as broadcast address. Consider the following subnet masks:

$M_1 : 255.255.208.0$

$M_2 : 255.255.224.0$

$M_3 : 255.255.240.0$

Which of the above subnet masks can be the subnet mask of given subnet?

**A** Only  $M_1$

**B** Only  $M_2$

**Solution :**  
(c)

160.24.223.255  
 $\downarrow$   
 11011111.1111 1111  
 $\uparrow$

In broadcast : Host bits are 1

In subnet mask : Subnet bits are 1

160.24.223.255  
 $\downarrow$   
 ----- 110 1 1111 -----  
 $\downarrow$   
 1's

Atleast these bits cannot be 0 for subnet mask.

And

$M_1$ : 255.255.208.0  
 $\downarrow$   
 1101 0000  
 $\rule{1cm}{0.4pt}$   
 Here 0, not subnet mask

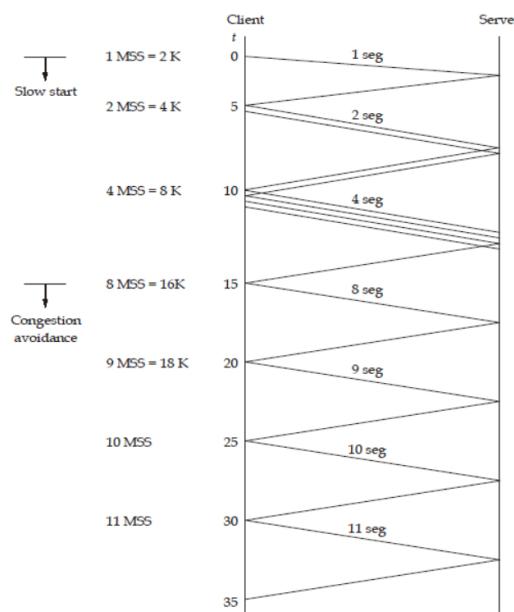
$M_2$ : 255.255.224.0  
 $\downarrow$   
 1110 0000  
 $\rule{1cm}{0.4pt}$   
 Follow the rule

$M_3$ : 255.255.240.0  
 $\downarrow$   
 1111 0000  
 $\rule{1cm}{0.4pt}$   
 Follow the rule

A TCP connection established between client and server with maximum segment size is 2 KB, slow-start threshold at client side is 16 KB. Assume, average round trip time of 5 ms, negligible time for transmission of segment and acknowledgement, and no timeouts or error in transmission. Let, the connection established at  $t = 0$ ; then total number of segments sent and acknowledged till  $t + 35$  ms is \_\_\_\_\_.

**Solution :**  
45

SS threshold = 16 KB  
 MSS = 2 KB  
 RTT = 5 ms



Total segments acknowledged at  
 $t + 35$  ms =  $1 + 2 + 4 + 8 + 9 + 10 + 11 = 45$

Your Answer is 12

QUESTION ANALYTICS +

Q. 10

Solution Video

Have any Doubt ?



Which of the following is/are correct for socket programming?

A blind() function binds a local IP address and port number (protocol number) to a socket.

Your option is Correct

B A passive socket is used by client.

Your answer is IN-CORRECT

C listen() function place the socket in passive mode.

Your option is Correct

D Accept() function used in UDP and TCP both type of sockets.

YOUR ANSWER - a,b,c

CORRECT ANSWER - a,c

STATUS -

Solution :

(a, c)

Passive socket used by server to wait for an incoming connection.

Accept() used only with TCP sockets, because it is connection oriented, and it help to accept the request for connection.

QUESTION ANALYTICS +

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